

REMARKS

Claims 3-5, 8, 10, 12, 13, and 18-24 are presented for further examination. Claims 1, 2, 6, 7, 9, 11, 14, and 15 have been cancelled. Claims 3, 4, 8, 10, 12, 13, and 18 have been amended.

In the final Office Action mailed February 18, 2003, the Examiner maintained the rejection of claims 1-15 and 18-24 under 35 U.S.C. § 103(a) as unpatentable over Bhatt et al. in view of Bickford et al. (both of record) and further in view of newly-cited U.S. Patent No. 5,686,697 ("Miller et al."). Applicants respectfully disagree with the basis for the rejection and request reconsideration and allowance of the claims as discussed in more detail below.

The claims have been amended so that the remaining claims all depend from independent claim 18. Independent claim 18 has been amended so that the step of depositing, developing, and selectively removing the sacrificial layer now reads:

depositing, developing, and selectively removing a sacrificial layer from the mask and the dry film to form windows on the dry film, *the dry film protecting the cavities from infiltration of liquids during the developing step;*

Support for this amendment is found on page 7, lines 5-15 of the specification as filed.

The disclosed and claimed embodiments of the invention utilize a dry film (e.g., a sticky foil 32) in the production of suspended elements in a micro-mechanism having components that move relative to one another. *The dry film is applied over the micro-mechanism.*

This claim process shows the following characteristics:

- (a) the dry film acts as a sacrificial layer to temporarily support the suspended elements;
- (b) the dry film does not itself enter the cavities of the micro-mechanism and therefore does not damage the same;
- (c) the dry film protects the cavities of the micro-mechanism from penetrations of liquid (without damaging the cavities) during development of a further sacrificial layer (37) that is used to form the windows; and
- (d) the dry film immobilizes the components of the micro-mechanism.

Bhatt et al., U.S. Patent No. 5,822,586, has already been discussed in the response to the previous Office Action, and applicants adopt that discussion herein. More particularly, Bhatt et al. does not refer to micro-mechanisms and to components that move relative to one another. Bhatt et al. also does not teach or suggest producing suspended elements. According to Bhatt et al., the film (322) is not removed to produce suspended elements, which is in distinction to the claimed invention which specifies removing of the dry film. There is no teaching or suggestion in Bhatt et al. that would lead one of ordinary skill to use a dry film in producing suspended elements in a micro-mechanical system.

Bickford, while describing a dry film and its removal in a conventional masking process, as discussed previously, there are many differences between this cited document and the present invention that can be found. Moreover, the combination of Bickford and Bhatt et al. fails to teach or suggest the claimed embodiment of the invention as set forth in claim 18.

Miller refers to the assembly of electrical components, i.e., electrical circuits. Nowhere does Miller teach or suggest the construction of micro-mechanisms as set forth in claim 18. Rather, Miller merely describes suspended electrical connections between electrical components that may move relative to one another. Miller fails to suggest or teach the use of a "dry film" and fails to teach or suggest the process steps indicated in claim 18. Moreover, Miller is completely silent about disadvantages of the known methods used in the references cited and applied by the Examiner.

Turning to claim 18, as recited therein, a method of producing suspended elements between two portions of a micro-mechanism containing components that move relative to one another on a semiconductor wafer is provided. The method includes applying the adhesive side of a dry film over the micro-mechanism on the semiconductor wafer to immobilize the movable components without penetrating any cavities therein; forming a mask on the dry film; and depositing, developing, and selectively removing a sacrificial layer from the mask and the dry film to form windows on the dry film, the dry film protecting the cavities from infiltration of liquids during the developing step. Claim 18 further recites the steps of depositing a dielectric layer to cover the windows without penetrating any underlying cavities; depositing a conductive layer that is attached to at least one movable portion of the micro-mechanism; and

selectively removing the conductive layer and the dielectric layer, and removing the dry film to form electrical connection elements suspended between the two portions of the micro-mechanism containing components that move relative to one another. As discussed above, nowhere do Bhatt et al., Bickford, or Miller, taken alone or in any combination thereof teach or suggest applying the adhesive side of the dry film over the micro-mechanism on the semiconductor wafer. This important feature of the invention, as discussed above with respect to characteristics (a) through (d), the combination of these three references fails to teach or suggest this important step. Moreover, when one of ordinary skill applies the teachings of the three cited references, such would have been directed to use a dry film in other steps. For example, all the masking steps concerning the removing of the sacrificial layer (37), the removing of the conductive layer, and the removing of the dielectric layer, as clearly taught by Bickford. Thus, the application of the adhesive dry film over the micro-mechanism is a feature not explicitly disclosed or implicitly suggested by the combination of the references cited and applied by the Examiner.

In view of the foregoing, applicants respectfully submit that claim 18 and the remaining claims that depend therefrom are all in condition for allowance.

In the event the Examiner finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicants' undersigned representative by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application. Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

The Commissioner is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

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All of the claims remaining in the application are now clearly allowable.
Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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Enclosure:

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